Learning from retailers:

Barcoding is a useful tool for labeling and tracking samples in field and lab settings

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Introduction

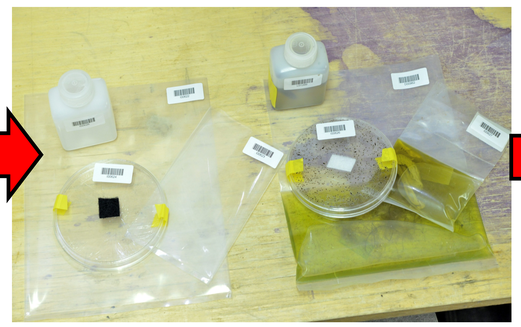
- Barcoding is widespread in retail and other industries, but rare in ecological research
- Research often still relies upon hand-drawn labels and basic spreadsheets for sample tracking
- Traditional method time-consuming, error-prone, lacks relational structure
- Introduced barcodes, handheld computers, and asset tracking software into framework of ecological research lab

System Overview

- Unique barcode labels designed, printed, and affixed to sample containers prior to fieldwork
- Data entry fields developed for basic sample information and storage location
- Barcoded sample containers scanned upon sample collection via handheld computers and sample information entered using touch-screen interface
- Handhelds synced with central database
- Sample information updated easily throughout laboratory processes (i.e., temp storage, sample prep, analysis, archiving, disposal)

Example Workflow

Print barcodes in large batches



Apply barcodes prior to field work

Scan, enter sample info in field

Update database with sample info

Update location for processing

Update location for temp storage

Update location for archival storage

Field Application

- Background
  - 18-day expedition style sampling trip on Colorado River
  - 1000+ pre-labeled sample containers (i.e., sticky traps)
  - Data entry fields developed in advance
  - Multiple handheld computers utilized concurrently to record sample information
  - Handhelds synced with field laptop after sample collection
  - Collated sample data error-checked immediately in field
- Results
  - Reduced time from sample collection to digital data collation
  - Data entry errors identified, corrected immediately, resulting in no data loss
  - Organizational structure for tracking samples upon return to lab

Discussion

- Decreases transcription errors and time in field and lab
- Decreases lag time between data collection and collation
- Provides organizational structure for tracking samples through lab processes
- Initial monetary investment of approximately $3000 for equipment and software
- Progressive technological change frightening, even if benefits outweigh costs

Conclusion

- Barcodes can benefit ecological labs that collect and manage large numbers of samples
- Long-term monitoring efforts and other multi-year research experiments with well-structured sample collection and processing procedures likely benefit

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